3. Subbasin Assessment – Pollutant Source Inventory

Pollution within the Big Lost River is related to land use and is primarily from excess sediment from streambank erosion. Sediment occurs naturally as a geologic process. Streams function to move sediment from source areas of high gradient and friable soil material through intermediate elevations and gradients to depositional reaches where sediment is incorporated into the flood plain or transported to larger waters and ultimately to the ocean. Land management practices have the potential to accelerate erosion or to alter depositional processes. This is when sediment becomes pollution. Sediment in excess of a stream's ability to transport it is pollution. Sediment pollution interferes with natural processes that aquatic life depends on and it can result in increased instability of natural stream channels further accelerating erosion.

Altering the dimension, pattern and profile of stream channels effects the transport and deposition of sediment as well as morphology of streams and rivers. To address one aspect of sediment pollution without regard to others on a watershed scale has little potential to successfully reduce sediment or improve water quality or fisheries on a meaningful scale. Initiating an increase in erosion or change in flow pattern can have grave consequences over many years. Many of the processes that are creating excessive amounts of sediment were initiated before these relationships were understood. Today, a number of land management practices are perpetuating the problems of the past and contributing to an increasing deficit of water quality and fisheries values.

3.1 Sources of Pollutants of Concern

The primary source of sediment pollution to water quality impaired streams within the Big Lost River watershed is streambank erosion. Other potential sources of sediment pollution, in any watershed, can include roads built too close to streams or improperly maintained, return of water from ditches laden with sediment to natural waters, erosion from cultivated fields, mass wasting or landslides related to improper engineering techniques and urban runoff. Streambank erosion is often significantly greater than these potential sources in the long term. Excess sediment has been determined to be primarily attributable to streambank erosion within the Big Lost River. Other sources of sediment to perennial reaches of listed streams do not compare with quantities of sediment from streambank erosion.

Sediment from streambank erosion is delivered directly to the stream channel without attenuation or deposition, as is often the case with natural hillslope erosion. Depositional features that result from streambank erosion often further accelerate erosion by redirecting flow into formerly stable banks. Eventually streambank stability is greatly reduced. As streambanks erode the width of the stream increases, riparian vegetation and the resultant shading to the stream channel provided by the vegetation decreases further decreasing the stability of streambanks and increasing the thermal load to the stream, another important pollutant related to streambank stability. This type of pollution accrues over a wide area and is considered nonpoint source pollution. Other sources can be considered point sources.

Point Sources

Point sources of pollution are affiliated with known discrete discharges, such as those from pipes or smoke stacks. They are regulated through several processes including the National Pollution Discharge Elimination System (NPDES). The NPDES is a process of permitting a discrete quantity of a pollutant under defined conditions that is felt to not impair water quality beyond the tolerance of aquatic organisms to support beneficial uses. There are three such sites in the Big Lost River watershed (Table 46). Two of them are hatcheries; the Idaho Department of Fish and Game Hatchery located at the source of Whiskey Creek, a tributary to Warm Springs Creek, and the Lost River Hatchery at the source of Warm Springs Creek, at Hamilton Springs. The remaining facility is the waste treatment plant operated by the City of Mackay. The waste treatment plant discharges to a wetland on a reach of the Big Lost River that is not listed as water quality impaired (§303(d) listed)

Table 55. NPDES permits in the Big Lost River Watershed.

Facility	Surface Water	NPDES Permit #	Exp. Date	Location	Effluent Limits	Discharge Volume
Lost River Hatchery	Warm Springs Creek	IDG130073	09/10/04	Hamilton Springs of Warm Springs Creek (N. Channel)	TSS 5 mg/l Daily Ave, 15.0 mg/l Daily Max, Settleable Solids 0.1 ml/l Daily Ave.	19 cfs min 23 cfs max
Mackay Fish Hatchery	Whiskey Creek	IDG130030	09/10/04	Whiskey Springs of Warm Springs Creek (S. Channel)	TSS 5 mg/l Daily Ave, 15.0 mg/l Daily Max, Settleable Solids 0.1 ml/l Daily Ave.	26 cfs
City of Mackay Waste Treatment Facility	Swauger Slough (Near the Big Lost River at Mackay, Idaho)	ID-002302-7	5/6/91	Mackay, ID	BOD 5d 20ºC 63mg/l 30d Ave. 95 mg/l 7d Ave max pH 6.0 min / 9.0 max TSS 70 mg/l 30d Ave 105 7d Ave max FC (per 100 ml) 100 cfu 30d geo mn 200 cfu 7d geo mn Flow Report 30dAve Chlorine(tot.resid) 1.2 mg/l max BOD 5d % removal 65% mo Ave min	

Nonpoint Sources

The primary source of nonpoint source pollution to streams in the Big Lost River subbasin is sediment from streambank erosion. Hillslope erosion, mass wasting roads and irrigation return flow have not been identified as significant sources of sediment to TMDL or listed streams. The primary cause of streambank erosion is alteration of stabilizing vegetation on streambanks that results in unstable streambanks. As streambank erosion progresses depositional features form in the channel that redirect current and further reduce bank stability. This process continues until the stream forms a new flood plain and deposition forms new streambanks that become colonized with stabilizing vegetation. This process can take many years to play out once channel alteration begins.

Land use, as previously discussed is primarily agricultural adjacent to streams impaired by temperature and sediment. The agricultural use that has the greatest effect on streambank stability is grazing. Grazing occurs throughout the subbasin in riparian areas.

Other sources of nonpoint source sediment pollution can include roads and erosion from cultivated fields.

Pollutant Transport

Pollutant transport related to sediment is primarily a function of particle size, channel type, channel width and channel gradient. Effected streams in the Big Lost River are primarily low gradient C channels with elevated fine particle composition above 6.35mm. Transport of sediment is farther for small particle sizes related to stream energy. Streambank composition in Starhope Creek and the East Fork of the Big Lost River below Starhope Creek includes a significant amount of large cobble to boulder size material and substrate composition reflects this. Above the confluence of Starhope Creek channel substrate is primarily sand and small gravel with some cobble size material.

3.2 Data Gaps

There are 3 NPDES permits within the Big Lost River watershed. They are discrete sources that incorporate monitoring that is outlined in the permit. Water quality conditions below the point of discharge do not reflect the conditions of the permits for the Hatcheries on Warm Springs Creek. The NPDES permit for the City of Mackay Waste Treatment Plant is adequate to maintain water quality on the Big Lost River near and below Mackay, particularly since the point of discharge is into a wetland area of Swauger Slough and gains the added removal benefit inherent to wetland function. Nonpoint sources described above relate to streambank erosion. Other sources include roads, cultivated fields, and natural background erosion. It is not necessary to complete a sediment budget for the watershed to identify the primary sources of sediment from erosion.

Point Sources

There are not pollutants generated by existing point sources not currently monitored. Better data is needed to show the actual discharge from the point sources on Warm Springs Creek to identify

the precise load reduction necessary to support coldwater aquatic life beneficial uses there. Current monitoring has not been effective in identifying the actual load leaving these facilities. There have been numerous complaints about sludge discharged from the hatchery, and water quality and substrate effects below the hatchery. There have been numerous follow up inspections and investigations by DEQ and EPA to evaluate the problem. Discharge monitoring reports do not reflect the conditions observed in the stream. This is indicative of inadequate settling systems or use of existing systems.

Nonpoint Sources

The greatest areas of uncertainty of nonpoint source pollution relate to identifying the precise load that a stream can assimilate and still support beneficial uses. There are guidelines for intergravel fine sediment, and evaluation of frequency distributions of riparian and streambank data show that 80% streambank stability is common in natural streams that support aquatic life beneficial uses. There are other variables related to stream channels dimension, pattern, and profile, at various elevations that buffer beneficial use support. These characteristics must be further evaluated.

With regard to temperature loading there is uncertainty about assimilative capacity of surface waters in relation to groundwater inputs, optimum riparian community, and the ability of fish to adapt to temperature increases over time. As stream order increases changes in channel dimension, pattern, and profile increase the loading of temperature naturally. A one-size-fits-all approach to temperature loading based exclusively on temperature standards without regard to river function related to the River Continuum Theory is a stop gap measure at best. Developing loads based on input of energy units is simplistic because it does not take into consideration groundwater inputs, stream channel geometry or vegetative potential. Large rivers warm and fish migrate to cooler water in tributaries. When tributaries at higher elevations are disturbed to the point that they exceed temperature criteria a warning is sounded that must be recognized and heeded.

This is not a matter of collecting more stream temperature data. More data is required to show that riparian and stream channel systems that are already stressed must be managed appropriately to facilitate recovery. Current management techniques do not appear to be improving conditions on streams in the upper Big Lost River watershed. Resting riparian areas for an adequate time to allow improvement of vegetation and subsequently streambank and channel condition appears to be the most effective way to bring about improvements to water quality here. The data exists within land management agencies that are needed to identify effective management techniques to allow for the needed improvements. That information simply needs to be utilized to improve management.

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